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Review Article

High-Flying Research Trends and Innovations in Young Athletes' Jump Training: A Bibliographic Analysis of Research Over Ten Years

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

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Abstract

Objectives. This bibliometric study aimed to track the evolution of research trends related to athletic jumps.

Materials and methods. This study was a systematic review with conducting a bibliometric analysis. Using a thorough approach, articles published since 2014 were found using the keywords "Athletics Jump Training" in research journals indexed in the SCOPUS database. A total of 222 articles were examined. Ten (10) articles were therefore selected for additional investigation using SciVal and the VOSviewer computer programs. For standard operationalization, this study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA).

Results. The highest number of articles was published in 2021, the highest citations was recorded in 2019, the greatest number of authors was involved in 2021, and the highest number of readers — in 2015. There were 3 keyword clusters that reflected various research focusing on athletics jump training for younger players. The most frequently occurring keywords in this study were "Athlete", "Muscle Strength", and "Athletic Performance". The United Kingdom (30), Brazil (25), and the United States (17) were the three nations with the highest number of publications on jump training in sports. Factors influencing the development of young jumper athletes and plyometric training for jump performance were the main themes that covered various aspects of the research trend over the last ten years, based on the top ten most cited references in athletics training for younger players.

Conclusions. The study focuses on athletics jump training for younger players, with notable publication peaks in 2021 and citation highs in 2019. Key themes in the most cited references include factors influencing young athletes' development and the role of plyometric training. The United Kingdom, Brazil, and the United States led in publications on this topic. Research on athletics jump for athletes under the age of 18 has grown significantly.

Keywords: athletics, jump, training, bibliographic.

Introduction

Jump training, also known as plyometrics, involves exercises that train muscles to exert maximum force in short intervals of time to increase power, strength, and explosiveness. Young elite long jumpers showed a trend towards improved vertical jump performance and lower perceived fatigue during the competitive phase (Franceschi et al., 2020). Improving technical skills in the long jump relies on a focus on biomechanical indices such as running speed, kinetic energy, and sensory system dominance (Wang et al., 2021). The event emphasizes explosive strength and coordination, with the athlete's natural ability playing a significant role (Tifrea & Costache, 2015). Elite long jumpers exhibit enhanced vertical jump performance and reduced fatigue during competition, with improved technical skills being closely tied to biomechanical factors like running speed and kinetic energy. At the same time, explosive strength, coordination, and inherent athletic ability remain crucial for success in the long jump event.

The most common injury in long jumpers was ankle sprains (23.3%), for high jumpers, flexor hallucis longus tendinosis (15.8%) (Enoki et al., 2021). Fast stretching combined exercise can effectively improve lower extremity explosive power in long jump athletes (Liu et al., 2022). Understanding research trends in athletics jump training for young players is essential for optimizing training practices, enhancing athlete development, and adopting evidence-based methods to improve performance and safety.

Bibliometric analysis helps identify important research issues, trends, and gaps in sports, guiding researchers to focus on relevant topics and gaps in the research (Dindorf et al., 2023). Bibliometric analysis helps explore and analyze large volumes of scientific data, shedding light on emerging areas and highlighting the evolutionary nuances of a specific field (Donthu et al., 2021). Bibliometric analysis helps understand the evolution of professional success as a scientific discipline, identifying patterns of convergence and divergence in various topics (Pico-Saltos et al., 2021)

Sport biomechanics research should focus on providing athletes and coaches with feedback based on biomechanical data, bridge the gap between researchers and practitioners, and improve performance analysis and technique improvement (Ae, 2020). The main deficiencies identified in plyometric jump training research are the lack of studies in women, individual sports, and high-level athletes, as well as inadequate descriptions of training prescriptions (Ramirez-Campillo et al., 2020). Various visual regulation strategies and movement adaptability are important in the long jump sprint, which influences the gait regulation towards the take-off board (McCosker et al., 2021)

Based on previous research: focus on squat style long jump assessment only (Kastrena et al., 2020), lack of concern in Indonesian athletic (Daulay et al., 2020), lack of appropriate training methods for optimal long jump performance (Yani, 2015). This study is crucial as it highlights recent trends and advancements in jump training for young athletes over the past decade, providing a comprehensive bibliographic analysis that can inform coaches, trainers, and researchers about evolving methodologies, effectiveness, and gaps in current practices. Its novelty lies in synthesizing a decade's worth of research to offer insights into the most impactful training strategies and emerging trends in the field.

The primary goal of this bibliometric study is to track the evolution of research trends in athletic jump.

1. To examine the patterns in athletic jump training research over the previous ten years.
2. To examine the nations that have contributed to the last ten years' research trends in athletic jump training.
3. To examine the pattern of keyword clusters in the last ten years' research trends related to athletic jump training.
4. To evaluate the last ten years' top ten cited papers in the field of athletic training research trends.

Materials and Methods

Materials for Analysis

A total of two hundred and twenty two (222) articles were collected from Scopus. As a result, 139 articles were chosen for additional examination utilizing scival and VOS server software. For this systematic review, the top ten articles that received the most citations were chosen.

Data Source

A bibliometric analysis and systematic review is what this kind of study is called. A thorough approach was used to scan SCOPUS research journal databases for articles. The term "Athletics Jump Training" is utilized. Additionally, articles published within the previous ten years starting in 2024 were excluded from consideration.

Software

The software used in this research is scival and VOS-viewer. The ensuing subchapters detail each software's purpose and applications:

Scival

Finding high-quality research results in literature reviews requires careful sorting of the articles. On publisher websites, researchers have the option of manually sorting articles or using software. SciVal is an analytical tool used to evaluate and visualize research data and academic publications. Developed by Elsevier, the tool allows users, such as educational institutions and researchers, to gain insights into research performance, collaborations, and trends across a range of disciplines.

Vos Viewer

In research, novelty is an absolute necessity. A program called VOSviewer is used to map network-based research and visualize research mapping. Researchers frequently use this software to identify gaps in the research topic that needs to be explored. When gaps in the research topic are identified, there is a chance that the conducted research will be novel.

Procedure

As indicated in Figure 1, this study's standard operationalization adheres to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA).

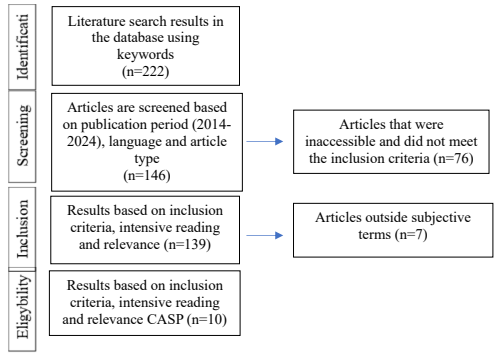

Fig. 1. PRISMA flowchart of the article selection process

Results

Research trend of jump training for young player. Table 1 displays the study trends on jump training for young players in this evaluation of the literature. There are significant annual fluctuations in the number of publications (f). On the other hand, the total citation count, or Total Cited, tends to rise over time.

Table 1. Jump training research conducted in young athletes from 2014 to 2024

Year	f	Total Cited	Author	Views
2014	10	208	53	444
2015	9	302	47	641
2016	12	212	53	491
2017	7	217	31	309
2018	6	113	38	290
2019	18	305	77	614
2020	10	42	48	272
2021	23	118	113	522
2022	18	84	99	465
2023	22	49	91	384
2024	10	4	45	109
Total	145	1654	695	4541

Table 2. Top 10 countries contributed to jump trainning research trend over 10 years for young athlete

Country	f	Total Cited	Views Count
United Kingdom	30	352	751
Brazil	25	268	481
United States	17	388	636
Spain	14	130	201
China	13	11	280
Rusia	12	26	374
Greece	11	233	327
Australia	11	269	397
Germany	10	133	528
Poland	9	39	189
Portugal	8	23	117
Total	93	1179	

Discussion

Various biomechanical and physiological factors, including take-off mechanics, flexibility, and the type of obstacles encountered, influence the jumping technique. The take-off phase significantly impacts the flight phase when jumping. Faster leg placement on the support correlates with an increased initial velocity and reduced flight time.

Table 3. Top 10 cited publications in jump trainning research for young athlete

Author/Total Cite	Methods	Result
Tønnessen et al., 2015 / 89	Mixed models	Usually the primary consider to display supreme and relative yearly execution improvements in running and hopping occasions for competitive competitors from early to late youth.
Loturco et al., 2018 / 73	Experiment	These discoveries strengthen the mechanical concepts supporting the force-vector hypothesis, and give coaches and wear researchers with important data almost the potential utilize and benefits of utilizing vertically- or horizontally-based preparing works out.
Bogdanis et al., 2014 / 56	Experiment	Isometric were more successful than CON and ECC muscle activities in expanding dangerous leg execution when the motivation of the ground response drive of the conditioning work out was compared
Chelly et al., 2015 / 49	Experiment	Including plyometric preparing moved forward imperative components of athletic execution relative to standard in-season preparing in youthful competitor
Loturco et al., 2019 / 48	Experiment	Quicker competitors performed way better in strength-power tests, in both stacked and emptied conditions, as affirmed by the solid relationships watched between speed and control measures.
Veliz et al., 2014 / 48	Experiment	Particular quality and high-intensity preparing in male WP players for 18 weeks delivered a positive impact on execution qualities exceedingly particular to WP.
Zaras et al., 2014 / 47	Experiment	Execution increments essentially after decreasing with LT or HT in track and field hurlers, but HT leads to greater increases in quality, entirety body control, and RFD.
Giroux et al., 2016 / 46	Experiment	Differences between measured and optimal force-velocity profiles raise potential sources of performance improvement in elite athletes.
Fischetti et al., 2018 / 41	Experiment	Eight weeks of plyometric training added to the standard program of athletics was highly likely to improve the lower limbs speed and explosive strength in young athletes
McCosker et al., 2019 / 31	Experiment	Jump should not be viewed as a behaviour in isolation, but rather as part of a complex system of connected performance events which contribute to achievement of competitive outcomes.

Fig. 2. Jump trainning research trend over 10 years for young athlete

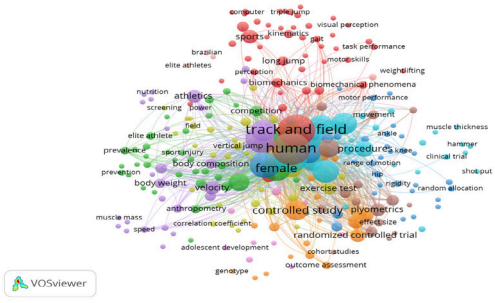

Fig. 3. Keyword cluster pattern in jump trainning research for young athlete

At the same time, a greater take-off angle enhances the total centre of mass velocity during flight (Rozhkov et al., 2022). Flexibility training, such as static stretching, can alter movement techniques during jumps. Although it increases ground contact time and joint flexion, it does not necessarily enhance performance outcomes (Zhang et al., 2020). In equine jumping, the type of obstacle affects jumping technique, with poor jumpers showing lower hindlimb acceleration at take-off. This highlights the importance of adapting jumping techniques based on external conditions (Barrey & Galloux, 2010).

Plyometric training provides superior benefits than strength training for improving vertical jump, linear sprint, and change of direction performance (Pardos-Mainer et al., 2021). Strength training with complementary dynamic whole body electromyostimulation and plyometric exercises improves maximal strength and jumping performance (Rappelt et al., 2023). Plyometric jump training can increase muscle activation during strength and jumping tasks, with a significant positive relationship between changes in muscle activation and changes in jumping performance (Ramirez-Campillo et al., 2021).

Young elite long jumpers show an increasing trend in vertical jump performance and possibly lower perceived fatigue during the competitive phase (Franceschi et al., 2020). Long jumpers have special muscular capabilities in their take-off muscles, with greater hip extensor torque and active contraction of the knee flexor group being important to avoid damage to the posterior femoral muscle group (Ren et al., 2022). Long jumpers need muscle strength training to develop isokinetic muscle strength, which can effectively prevent injury to lower extremity joint motion (Yang et al., 2022). Fast stretching combined exercise can effectively improve lower extremity explosive power in long jump athletes (Liu et al., 2022). Characteristics of long jump athletes include a focus on biomechanical indices such as running speed, kinetic energy, and sensory system dominance, with visual being the primary system in 42.42 % of athletes (Wang et al., 2021). Weighted squats can increase lower-limb explosive power in long jumpers, resulting in better athletic results (Zong, 2022). The front somersault technique, which involves a frontal flexion movement, has been proposed to allow for greater horizontal distance in the long jump due to reduced drag and increased angular momentum at takeoff (Williams, 2023).

High jumpers can improve their leg support strength by applying isokinetic knee joint strength training (Li et al., 2022). High jumpers exhibit lower fascicle shortening velocities and higher tendon velocities, indicating more efficient neuromuscular control (Jo & Lee, 2023). The main deficiencies identified in plyometric jump training research are the lack of studies in women, individual sports, and high-level athletes, as well as inadequate descriptions of training prescriptions (Ramirez-Campillo et al., 2021). Strengthening psychological training in athletes, along with regular physical training, is an important factor in increasing competition effectiveness (Cheng, 2023). The curved approach to the high jump results in a greater center of mass height without increasing joint kinetic forces during takeoff (Sado et al., 2021).

Triple jump athletes require high physical qualities such as muscular strength, explosive power, and coordination capacity, as well as a training plan that enhances adaptability and self-protection abilities (Cao & Wang, 2023). Three-step jumpers have a wider take-off range and a longer take-off time, with a 25 cm platform depth jump exercise that achieves the best take-off effect (Ma, 2021). Highly skilled triple jumpers reduce the duration of the flight period in the final step, increase the takeoff speed, and use different options for combining takeoff and takeoff (Konestyapin et al., 2022).

Conclusions

The research focuses on athletics jump training for younger players, with notable publication peaks in 2021 and citation highs in 2019. Key themes in the top-cited references include factors influencing young athletes' development and the role of plyometric training. Western countries such as the United Kingdom, Brazil, and the United States led in publications on this topic. The current studies should focus on Functional Movement Screening (FMS), whereby, in recent years, screening tools like FMS have been used to assess baseline movement patterns and identify potential injury risks before implementing jump training. Another point to look into is the age-specific periodization training. Tailored jump training programs based on the developmental stages of young athletes have gained importance. Lastly, the emphasis is on the gradual increase in intensity, focusing on biomechanics and injury prevention. Jump training may reduce injury risks, such as anterior crucial ligament (ACL) tears, through exercises that promote better landing mechanics, strength in supporting muscles (quads, hamstrings, hips), and balance.

Future research should focus on longitudinal studies to assess the long-term impacts of recent training innovations on performance and injury prevention. Comparative analy-

ses of various training methods could reveal the most effective approaches, while biomechanical studies could explore how specific techniques affect outcomes. Integrating new technologies, such as wearable sensors and virtual reality, may enhance training and performance monitoring. Additionally, investigating psychological factors, customizing training programs, and developing injury prevention strategies are crucial. Exploring cross-sport training comparisons, cultural and regional differences, and the relationship between training load and recovery can further refine and optimize jump training practices for young athletes. Personalized or individually tailored training is the key to better sporting performance among youth, and this impact can be maintained throughout adulthood.

Conflict of Interest

Authors declare no conflict of interest regarding this paper.

References

Franceschi, A., Conte, D., Airale, M., & Sampaio, J. (2020). Training Load, Neuromuscular Readiness, and Perceptual Fatigue Profile in Youth Elite Long-Jump Athletes. *International Journal of Sports Physiology and Performance,* 1-5. https://doi.org/10.1123/ijspp.2019-0596

Wang, W., Kozlova, E., & Kozlov, K. (2021). Technology for Improving the Technical Skills of Skilled Long Jumpers. *Sport Mont.* https://doi.org/10.26773/smj.210914

Tifrea, C., & Costache, R. (2015). Comparative Study on the Long Jump's Biomechanics in the Case of Athletes in Major Competitions. *Logos Universality Mentality Education Novelty. Section: SOCIAL SCIENCES,* 04, 157–165. https://doi.org/10.18662/lumenss.2015.0401.14

Enoki, S., Nagao, M., Ishimatsu, S., Shimizu, T., & Kuramochi, R. (2021). Injuries in Collegiate Track and Field Jumping: A 2-Year Prospective Surveillance Study. *Orthopaedic Journal of Sports Medicine,* 9. https://doi.org/10.1177/2325967120973397

Liu, T., Wu, J., Zheng, B., Xie, J., & Wang, X. (2022). Effects of rapid stretching on explosive power of the lower extremity in long jump athletes. *Revista Brasileira de Medicina Do Esporte.* https://doi.org/10.1590/1517-8692202329012022_0294

Dindorf, C., Bartaguiz, E., Gassmann, F., & Fröhlich, M. (2023). Conceptual Structure and Current Trends in Artificial Intelligence, Machine Learning, and Deep Learning Research in Sports: A Bibliometric Review. *International Journal of Environmental Research and Public Health, 20*(1). https://doi.org/10.3390/ijerph20010173

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research,* 133, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Pico-Saltos, R., Carrión-Mero, P., Montalván-Burbano, N., Garzás, J., & Redchuk, A. (2021). Research Trends in Career Success: A Bibliometric Review. *Sustainability, 13*(9). https://doi.org/10.3390/su13094625

Ae, M. (2020). The next steps for expanding and developing sport biomechanics. *Sports Biomechanics,* 19, 701-722. https://doi.org/10.1080/14763141.2020.1743745

Ramirez-Campillo, R., Moran, J., Chaabene, H., Granacher, U., Behm, D. G., García-Hermoso, A., & Izquierdo, M. (2020). Methodological characteristics and future directions for plyometric jump training research: A scoping review update. *Scandinavian Journal of Medicine & Science in Sports,* 30, 983-997. https://doi.org/10.1111/sms.13633

McCosker, C., Renshaw, I., Greenwood, D., Davids, K., & Gosden, E. (2019). How performance analysis of elite long jumping can inform representative training design through identification of key constraints on competitive behaviours. *European Journal of Sport Science, 19*(7), 913-921. https://doi.org/10.1080/17461391.2018.1564797

Daulay, D. E., Priono, J., & Natas Pasaribu, A. M. (2020). Efektifitas Pembelajaran dengan Media untuk Perbaikan Hasil Lompat Jauh. *Competitor, 12*(2), 74-82. https://doi.org/10.26858/cjpko.v12i2.13988

Kastrena, E., Suherman, A., Ma'mun, A., Nugraha, E., & Nur, L. (2020). Long Jump Ability: A Comparison Between Students with High and Low Physical Fitness. Proceedings of the 4th International Conference on Sport Science, Health, and Physical Education (ICSSHPE 2019). *4th International Conference on Sport Science, Health, and Physical Education (ICSSHPE 2019),* Bandung, Indonesia. https://doi.org/10.2991/ahsr.k.200214.082

Yani, A. (2015). Pengaruh Metode Latihan Sirkuit, Metode Konvensional dan Motivasi Berprestasi terhadap Kemampuan Lompat Jauh Gaya Jongkok. *Primary, 4*(2), 134-142.

Tønnessen, E., Svendsen, I. S., Olsen, I. C., Guttormsen, A., & Haugen, T. (2015). Performance development in adolescent track and field athletes according to age, sex and sport discipline. *PLoS ONE, 10*(6). https://doi.org/10.1371/journal.pone.0129014

Loturco, I., Contreras, B., Kobal, R., Fernandes, V., Moura, N., Siqueira, F., Winckler, C., Suchomel, T., & Pereira, L. A. (2018). Vertically and horizontally directed muscle power exercises: Relationships with top-level sprint performance. *PLoS ONE, 13*(7). https://doi.org/10.1371/journal.pone.0201475

Bogdanis, G. C., Tsoukos, A., Veligekas, P., Tsolakis, C., & Terzis, G. (2014). Effects of muscle action type with equal impulse of conditioning activity on postactivation potentiation. *Journal of Strength and Conditioning Research, 28*(9), 2521-2528. https://doi.org/10.1519/JSC.0000000000000444

Chelly, M. S., Hermassi, S., & Shephard, R. J. (2015). Effects of In-Season Short-term Plyometric Training Program on Sprint and Jump Performance of Young Male Track Athletes. *Journal of Strength and Conditioning Research, 29*(8), 2128-2136. https://doi.org/10.1519/JSC.0000000000000860

Loturco, I., Kobal, R., Kitamura, K., Fernandes, V., Moura, N., Siqueira, F., Cal Abad, C. C., & Pereira, L. A. (2019). Predictive Factors of Elite Sprint Performance: Influences of Muscle Mechanical Properties and Functional Parameters. *Journal of Strength and Conditioning Research, 33*(4), 974-986. https://doi.org/10.1519/JSC.0000000000002196

Veliz, R. R., Requena, B., Suarez-Arrones, L., Newton, R. U., & De Villarreal, E. S. (2014). Effects of 18-week in-season heavy-resistance and power training on throwing velocity, strength, jumping, and maximal sprint swim performance of elite male water polo players. *Journal of Strength and Conditioning Research, 28*(4), 1007-1014. https://doi.org/10.1519/JSC.0000000000000240

Zaras, N. D., Stasinaki, A.-N. E., Krase, A. A., Methenitis, S. K., Karampatsos, G. P., Georgiadis, G. V, Spengos, K. M., & Terzis, G. D. (2014). Effects of tapering with light vs. heavy loads on track and field throwing performance. *Journal of Strength and Conditioning Research, 28*(12), 3484-3495. https://doi.org/10.1519/JSC.0000000000000566

Giroux, C., Rabita, G., Chollet, D., & Guilhem, G. (2016). Optimal balance between force and velocity differs among world-class athletes. *Journal of Applied Biomechanics, 32*(1), 59-68. https://doi.org/10.1123/jab.2015-0070

Fischetti, F., Vilardi, A., Cataldi, S., & Greco, G. (2018). Effects of plyometric training program on speed and explosive strength of lower limbs in young athletes. *Journal of Physical Education and Sport, 18*(4), 2476-2482. https://doi.org/10.7752/jpes.2018.04372

Rozhkov, V., Taran, L., Okun, D., Riadova, L., & Shutieiev, V. (2022). Influence technique of the take-off phase on the flight phase of the hop in the female triple jump among elite athletes. *Scientific Journal of National Pedagogical Dragomanov University. Series 15. Scientific and Pedagogical Problems of Physical Culture (Physical Culture and Sports), 11*(157), 126-129. https://doi.org/10.31392/NPU-nc.series15.2022.11(157).29

Zhang, Q., Trama, R., Fouré, A., & Hautier, C. A. (2020). The Immediate Effects of Self-Myofacial Release on Flexibility, Jump Performance and Dynamic Balance Ability. *Journal of Human Kinetics,* 75, 139-148. https://doi.org/10.2478/hukin-2020-0043

Barrey, E., & Galloux, P. (2010). Analysis of the equine jumping technique by accelerometry. *Equine Veterinary Journal. Supplement,* 23, 45-49. https://api.semanticscholar.org/CorpusID:509714

Pardos-Mainer, E., Lozano, D., Torrontegui-Duarte, M., Cartón-Llorente, A., & Roso-Moliner, A. (2021). Effects of Strength vs. Plyometric Training Programs on Vertical Jumping, Linear Sprint and Change of Direction Speed Performance in Female Soccer Players: A Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health, 1*8(2). https://doi.org/10.3390/ijerph18020401

Rappelt, L., Micke, F., Held, S., Dörmann, U., Kleinöder, H., & Donath, L. (2023). Effects of Four Weeks of Static vs. Dynamic Bodyweight Exercises with Whole-Body Electromyostimulation on Jump and Strength Performance: A Two-Armed, Randomized, Controlled Trial. *Journal of Sports Science & Medicine, 22*(2), 226-234. https://doi.org/10.52082/jssm.2023.226

Ramirez-Campillo, R., Garcia-Pinillos, F., Chaabene, H., Moran, J., Behm, D. G., & Granacher, U. (2021). Effects of Plyometric Jump Training on Electromyographic Activity and Its Relationship to Strength and Jump Performance in Healthy Trained and Untrained Populations: A Systematic Review of Randomized Controlled Trials. *The Journal of Strength & Conditioning Research, 35*(7). https://journals.lww.com/nsca-jscr/fulltext/2021/07000/effects_of_plyometric_jump_training_on.35.aspx

Ren, Y., Luo, B., & Chu, J. (2022). Biomechanical Research on Special Ability of Long Jump Take-Off Muscle Based on Multisource Information Fusion. *Applied Bionics and Biomechanics,* 2022. https://doi.org/10.1155/2022/2556087

Yang, Z., Li, B., Li, H., & Guan, L. (2022). Isokinetic muscle strength characteristics of lower limb joints in long jumpers. *Revista Brasileira de Medicina Do Esporte.* https://doi.org/10.1590/1517-8692202329012022_0330

Zong, P. (2022). Strength training of long jump athletes. *Revista Brasileira de Medicina Do Esporte.* https://doi.org/10.1590/1517-8692202329012022_0278

Williams, H. (2023). Dynamics of the flip long jump. Physics Education, 59. https://doi.org/10.1088/1361-6552/ad0e15

Li, Z., Xu, J., & Ou, S. (2022). Isokinetic kneel muscle strength characteristics in high jump athletes. *Revista Brasileira de Medicina Do Esporte.* https://doi.org/10.1590/1517-8692202329012022_0276

JJo, I., & Lee, H.-D. (2023). Joint Coordination and Muscle-Tendon Interaction Differ Depending on The Level of Jumping Performance. *Journal of Sports Science and Medicine,* 189-195. https://doi.org/10.52082/jssm.2023.189

Cheng, F. (2023). Pre-competition psychological training in college jumping athletes. *Revista Brasileira de Medicina Do Esporte.* https://doi.org/10.1590/1517-8692202329012022_0637

Sado, N., Yoshioka, S., & Fukashiro, S. (2021). Curved Approach in High Jump Induces Greater Jumping Height without Greater Joint Kinetic Exertions than Straight Approach. *Medicine & Science in Sports & Exercise,* 54, 120-128. https://doi.org/10.1249/MSS.0000000000002761

Cao, S., & Wang, H. (2023). Injury prevention in the training of triple jump athletes. *Revista Brasileira de Medicina Do Esporte.* https://doi.org/10.1590/1517-8692202329012022_0622

Ma, Y. (2021). Kinematics Study of Depth Jump on Male Triple Jumpers with Slope Run-Up. *Mathematical Problems in Engineering.* https://doi.org/10.1155/2021/4867451

Konestyapin, V., Pavlos, O., Khanikiants, O., Dunets-Lesko, A., Dukh, T., & Svyshch, Y. (2022). Time Characteristics of Technical Readiness of Female Triple Jumpers of High Qualification. *Physical Education Theory and Methodology.* https://doi.org/10.17309/tmfv.2022.2.21

Провідні наукові тенденції та інновації щодо стрибкових тренувань юних спортсменів: Бібліографічний аналіз досліджень за десять років

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 7 с., 3 табл., 3 рис., 40 джерел.

Мета дослідження. Це бібліометричне дослідження мало на меті відстежити еволюцію дослідницьких тенденцій, пов'язаних із тематикою легкоатлетичних стрибків.

Матеріали та методи. Дослідження представляло собою систематичний огляд із проведенням бібліометричного аналізу. Застосовуючи ґрунтовний підхід до проведення дослідження, у журналах, індексованих в наукометричній базі даних SCOPUS знайдено статті, опубліковані з 2014 року за ключовими словами "Athletics Jump Training" («Тренування стрибків у легкій атлетиці»). Загалом було досліджено 222 статті. У результаті було відібрано десять (10) статей з метою додаткового вивчення за допомогою комп'ютерних програм SciVal та VOSviewer. Щодо стандартної операціоналізації, це дослідження відповідало стандартам «Переважних елементів звітування для систематичних оглядів і мета-аналізів» (PRISMA).

Результати. Найвищий показник кількості опублікованих статей спостерігався у 2021 році, найвищий показник цитованості зафіксовано у 2019 році, найбільша кількість авторів була залучена у 2021 році, а максимальна кількість читачів – у 2015 році. Виявлено 3 кластери ключових слів, що відображають численні дослідження, зосереджені на вивченні легкоатлетичних тренувань стрибків юних спортсменів. Найпоширенішими ключовими словами в рамках зазначених досліджень були «Спортсмен», «М'язова сила» та « Спортивна результативність». Велика Британія (30), Бразилія (25) і Сполучені Штати (17) склали трійку країн з найбільшою кількістю публікацій щодо стрибкових тренувань у спорті. Фактори, що впливають на розвиток юних спортсменів-стрибунів та пліометричні тренування, спрямовані на підвищення результативності виконання стрибків, були головними темами, які охоплювали різні аспекти дослідницької тенденції за останні десять років, ґрунтуючись на десяти найбільш цитованих джерелах у галузі легкоатлетичної підготовки юних спортсменів.

Висновки. Дослідження фокусується на вивченні легкоатлетичних стрибкових тренувань юних спортсменів, зокрема значний рівень кількості публікацій спостерігався у 2021 році, а максимальний показник цитованості – у 2019 році. До ключових тематик найбільш цитованих публікацій належать фактори, що впливають на розвиток юних спортсменів, а також роль пліометричних тренувань. Лідерами за кількістю публікацій на зазначену тематику були Велика Британія, Бразилія та США. Відзначено суттєвий ріст кількості досліджень щодо вивчення легкоатлетичних стрибків спортсменів вікової категорії до 18 років.

Ключові слова: легка атлетика, стрибок, тренування, бібліографічний.

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